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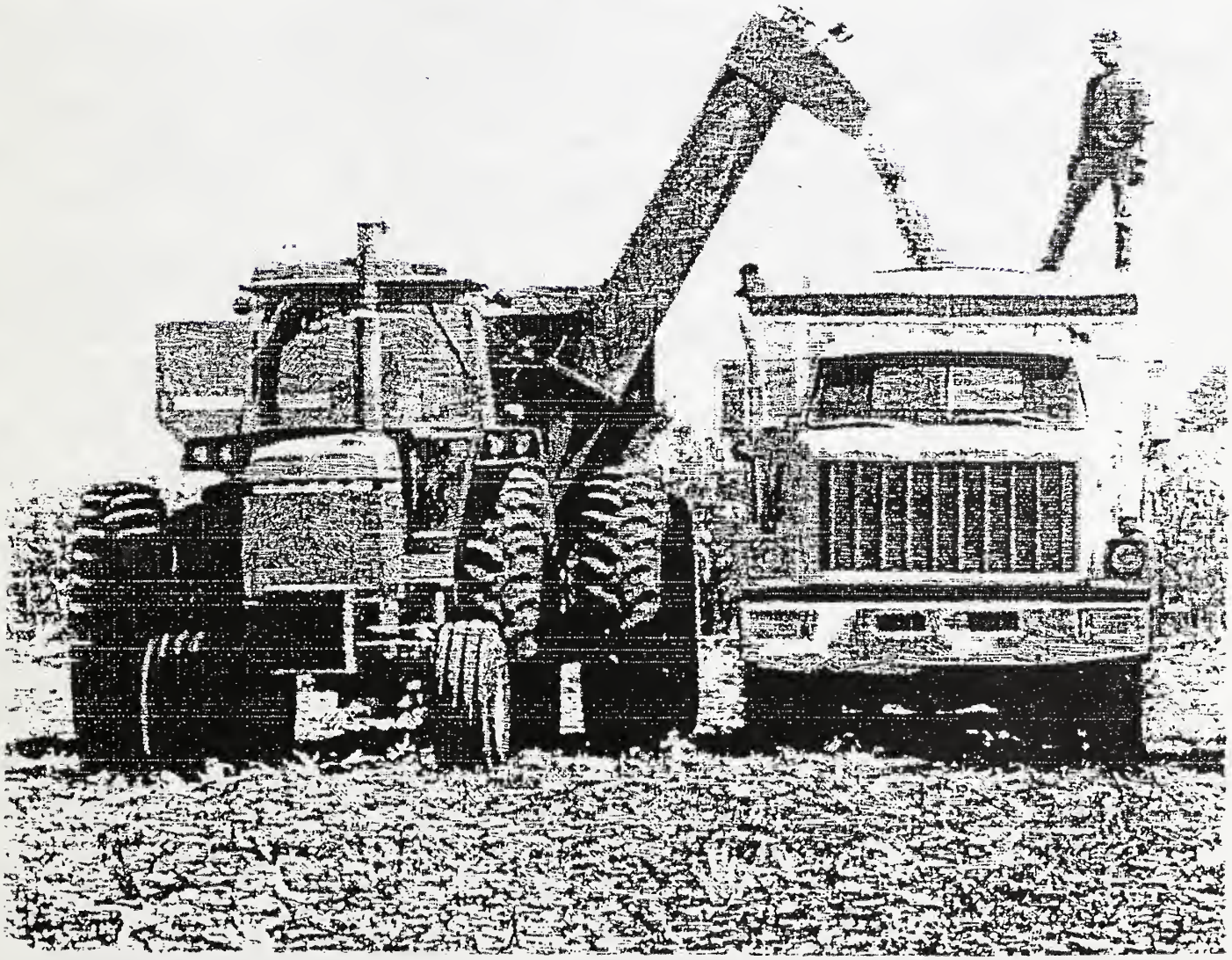
1992 Annual Report of Activities

Jamie L. Whitten Plant Materials Center
Coffeeville, Mississippi



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JAMIE L. WHITTEN PLANT MATERIALS CENTER

COFFEEVILLE, MISSISSIPPI

INTRODUCTION

The Jamie L. Whitten Plant Materials Center (PMC) located at Coffeeville, Mississippi, is operated by the United States Department of Agriculture's (USDA) Soil Conservation Service (SCS). It is a part of a nationwide network of 26 centers operated by the SCS. Because better plants were needed for conservation programs, the National Plant Materials Program was established soon after the SCS was founded.

Purpose of the Plant Materials Program is to provide cost-effective vegetative solutions for soil and water conservation. This involves identifying plants for conservation use, developing techniques for their successful use, providing for their commercial increase, and promoting their acceptance in resource conservation and other environmental programs. Since the beginning of the Plant Materials Program, over 300 varieties of superior plants have been released nationwide for resource conservation and environmental programs.

The PMC began operations on August 8, 1960 as the Yazoo-Little Tallahatchie Flood Prevention Seed Unit. The Seed Unit was discontinued in 1982, and the plant materials activities were reorganized and expanded. Since its beginnings, the PMC has evaluated over 6,800 accessions of plants for many conservation purposes including erosion control on cropland, stream channels, and critical areas as well as better plants for forage, wildlife food and cover, and wetlands mitigation and restoration.

The PMC works cooperatively with other agencies and organizations in the evaluation, development and release of new plant cultivars. Some of these cooperators include other PMCs, the Mississippi Agricultural and Forestry Experiment Station (MAFES), Mississippi Association of Conservation Districts, USDA Forest Service, USDA Agricultural Research Service (ARS), various colleges and universities. In addition, the PMC has agreements with the National Park Service (Natchez Trace Parkway), and the Corps of Engineers (Waterways Experiment Station) for the production of native plant materials and research on wetland plants.

LOCATION AND FACILITIES

The Jamie L. Whitten PMC is located within the Holly Springs National Forest on state Highway 330 between Coffeeville and Tillatoba, Mississippi. The headquarters area is located about 5 miles east of Interstate Highway 55, and consists of offices and laboratory spaces, greenhouse complex, seed cleaning and warehouse buildings, equipment storage and shop areas, and herbicide and fuel storage facilities.

Facilities have been upgraded during the last two years. A new greenhouse and office complex was constructed in 1992 with provisions to carry out work relating to seed technology, tissue culture, and water quality experiments. A water and forage analyses lab was added to the main office for the purpose of serving other PMCs.

Equipment to analyze water samples should be operational by July, 1993. Completion of the forage testing segment of the lab is scheduled for late 1993.

Located a short distance from the headquarters area are the main PMC fields. These are a combination of bottomland and hillside fields, of irregular size and shapes as defined by streams and drainages, roads and terrain. Bottomland fields consist of a Oaklimeter silt loam which is naturally very acid and wet. With drainage and water control, this soil has potential of being very productive. Soils of the slopes are predominantly Loring and Grenada silt loams with fragipans. This combination of soils types, streams, and terrain provides a variety of situations for testing plants for many conservation needs. The main PMC field is approximately 180 acres and some of this can be irrigated from two irrigation storage ponds located on the PMC. In addition to these fields, the PMC also has the option to use other fields within the National Forest boundaries.

WEATHER

Weather conditions for 1992 were generally very favorable for plant growth. The 1991-1992 winter temperatures were mild, with no extended freezes. Rainfall was normal from January through March, and was below normal during April and May. Early April was hot with temperatures in the 90's, but temperatures cooled in late April, with high's of 35-40 degrees. The last freeze occurred on April 3, 1992. May was also cooler than normal, and extremely dry. Many of the plantings required irrigation by late May. A much needed rain on June 3 brought relief. For the remainder of the growing-season, above average, well distributed rainfall kept soil moisture replenished. Temperatures from May through September were below seasonal norms. Above normal rainfall and below normal temperatures created very favorable growing conditions for plant growth and development.

The most disastrous event during the 1992 growing-season was Hurricane Andrew which hit Mississippi on August 27. Coffeeville experienced strong, gusty winds from 40-50 mph, and heavy rains. Major damage locally was downed trees and lodging of crops, particularly cotton and corn. The PMC endured the affects of the hurricane with little damage, other than twisting and lodging of some plants and minor flooding.

A light, early frost was experienced on October 10, but no freezing weather occurred until November 7. Weather for November and early December was generally cool and clear, contrasted to the last half of December which was bleak and dreary.

The 1992 growing-season was 218 days (April 3 - November 7). Monthly weather data for the last quarter of 1991 and the first three quarters of 1992 is summarized in Table 1. Weather data is provided by the United States Environmental Protection Agency (EPA) which maintains a National Dry Deposition Network weather station near the PMC. The final quarter weather data was unavailable at time of publication.

TABLE 1 - 1991-1992 WEATHER SUMMARY
(1 Oct 1991-30 Sept 1992)

Temperature (^{0} F)

Year/Month		91 Oct	91 Nov	91 Dec	92 Jan	92 Feb	92 Mar	92 Apr	92 May	92 Jun	92 Jul	92 Aug	92 Sept
Extreme	Hi	83	76	70	62	71	78	84	87	90	91	89	88
	Lo	40	20	29	14	24	26	32	54	60	69	65	58
Monthly Average 1991-1992	Hi	74	58	55	50	58	62	71	72	82	86	82	79
	Lo	55	40	40	35	42	44	51	54	65	71	66	63
Monthly Average 1976-1992	Hi	72	60	50	46	52	62	71	78	87	91	89	84
	Lo	51	42	34	30	35	43	51	60	68	73	71	65

Yearly Average Temperature (1976-1992): Hi 70; Lo 52

Rainfall (Inches)

Year/Month	91 Oct	91 Nov	91 Dec	92 Jan	92 Feb	92 Mar	92 Apr	92 May	92 Jun	92 Jul	92 Aug	92 Sept
10/1/91 thru 9/30/92	1.89	4.06	13.3	2.6	3.41	4.12	1.73	2.01	7.13	2.33	5.93	4.07
1976-1992 Average	3.99	6.55	6.14	4.22	5.05	5.74	5.58	6.24	5.05	4.11	3.06	4.31

Total rainfall: 52.58 inches

Yearly Average Rainfall (1976-1992): 60.03 inches

SERVICE AREA

Primary service area of the Jamie L. Whitten PMC includes all of Mississippi, except for the coastal area which is served by the Brooksville PMC, Brooksville, Florida, and parts of Alabama, Arkansas, Louisiana, Missouri, Kentucky, and Tennessee. The reason for serving a multi-state area is due to similarities in soils, climate, topography, and land usages associated within major land resource areas (MLRAs) 131, 133A, 134, and 135. The map below identifies the state boundaries and MLRAs served by the PMC.

LONG-RANGE PROGRAM

Conservation problems that exist in the PMC service area have been identified in the long range program. The long range program is established by the State Conservationist's Advisory Committee to direct the plant materials activities. Outlined below are the major conservation problems and level of priority established by the State Conservationist's Advisory Committee.

CROPLAND EROSION CONTROL	PRIORITY
Winter cover compatible with no-till or conservation tillage	High
Better plants for field borders, strips and steep terraces	High
Continuous cover for cropland	Low
Inexpensive vegetative substitutes for drop structures	Medium
PASTURE AND RANGELAND EROSION CONTROL	
Perennial cool-season forage grasses	Medium
Warm-season forage grasses	Medium
Legumes compatible with grasses	Medium
WOODLAND EROSION CONTROL	
Desirable plants for clear-cut sites	Medium
CRITICAL AREA EROSION CONTROL	
Vegetation for drastically disturbed sites	Medium
Vegetation for shorelines of ponds, lakes, and streams	Medium
Plants for soil damaged by chemicals or industrial wastes	Medium
WATER QUALITY IMPROVEMENT	
Non-point pollution and contamination of groundwater	High
Removal of toxic chemicals	Medium
Animal waste treatment	Medium

PLANT MATERIALS TESTING PROCESS

The PMC has established a systematic testing process to provide plants to solve conservation problems identified in the long range program. Testing involves seven basic steps that determine the performance, adaptiveness, and release of plants for conservation use. Following is a description of each step involved in the testing process.

STEP 1 - ASSEMBLY

Once a conservation problem has been targeted and a plant species selected with the potential to address the problem, the search for a superior plant is initiated. Plant collections are made from native or naturalized plant stands throughout the PMC service area. Periodically, collections are extended into other geographical areas where the plant is adapted for the purpose of gathering a diverse population of ecotypes or strains. Collections may also originate from foreign sources and coordinated through the plant introduction (PI) stations. Seed and/or vegetative materials of grasses, forbs, legumes, and woody species are normally field collected for two years by SCS field and area personnel and PMC staff in order to provide adequate numbers for initial evaluation plantings. After the collection arrives at the PMC, it is given an accession number for identification purposes during the testing process.

STEP 2: INITIAL EVALUATIONS

Next in the testing process is the initial evaluation of the plant species. The accessions (individual collections) are either direct seeded in the initial evaluation plot or established in the greenhouse from seed or vegetative stock, and later transplanted to the initial evaluation plot. Plants are planted side by side at the PMC for meaningful comparisons. Supplemental irrigation is used only in the establishment year. Fertilizer is used to correct major nutrient deficiencies, and provide a favorable environment for plant growth. Plantings are generally evaluated for three years. During that time, PMC personnel make visual comparisons of plant characteristics such as vigor, seed production, disease and insect resistance, heat and cold tolerance. Also, the plants are measured and dates of flowering and maturity recorded. At the end of this phase, superior accessions are selected for increase and advanced evaluations.

STEP 3: INITIAL SEED/PLANT INCREASE

Generally, before advanced evaluations are conducted and/or large scale increase fields established, initial seed increase blocks of superior accessions are established. During this stage, appropriate measures are taken to isolate superior accessions to

prevent crossing and maintain genetic purity. When sufficient amounts of seed or vegetative material is available, advance evaluation plantings are made.

STEP 4: ADVANCED EVALUATIONS

During this step, superior accessions selected from initial evaluation undergo more rigorous testing. In advanced evaluations, superior accessions are compared to commercial materials, if available. Advanced evaluations may include comparative clipping trials to evaluate yield and quality of grasses and legumes, and seed yield and quality tests. Also, studies that involve developing or improving cultural and management techniques are addressed. Such studies may include establishment and management recommendations for native vegetation, or developing cultural techniques for reducing soil erosion, i.e., no-till systems for low residue crops. Personnel from state and federal agencies are encouraged to participate in these studies. Results from these studies could be adopted into the SCS standards and specifications, where applicable. Advance evaluations are generally conducted at the PMC; however, these studies may be conducted off-center where soils and climatic conditions strongly contrast with those at the PMC.

Generally, only one accession is selected for production from advanced evaluations.

STEP 5: LARGE SCALE INCREASE

During or following advanced evaluations, an accession with potential to solve the problem are established in a production field at the PMC. These production fields are irrigated and fertilized to obtain maximum seed or plant production. Seed or vegetative materials are harvested from these blocks and used in field plantings.

STEP 6: FIELD PLANTINGS

Field plantings are the final step in the testing process. Varied sites, in the PMC service area are selected to test the potentially new cultivar under actual field conditions. Plantings are conducted on soil and water conservation district cooperators farms and ranches, private industries, and federal and state lands.

STEP 7: NAME AND RELEASE

Plants that prove themselves in field plantings are given a unique name and cooperatively released by the SCS and participating state and federal agencies. Breeder and foundation seeds/plants are produced by the PMC, and made available to the state foundation seed service for distribution to commercial growers.

ACTIVE PROJECTS IN 1992

Conservation problems outlined in the PMC Long-Range Program serves as the foundation for the development of all PMC project plans. Active projects being conducted at the PMC in 1992 will be categorized according to the conservation problem it addresses in the Long-Range Program.

CROPLAND EROSION CONTROL

Winter Cover Compatible With No-till or Conservation Tillage

INITIAL EVALUATION PROJECTS

Project 28I112M - Selection of a Dwarf Cultivar of Rye, *Secale cereale*

Objective of this study is to a select a cultivar(s) that produce adequate canopy cover with low plant height.

One hundred accessions were evaluated during 1991-1992 growing-season. In general, low plant height was associated with poor plant vigor. Seven were rated at least 6 for plant vigor (scale 0-9; 0=poor 9=good) and had a maximum mature plant height of 64 cm. These accessions are: CI-89, PI-446043, PI-446245, PI-446263, PI-446266, PI-470297, and PI-446247.

Significant finding(s)

Rye is very cold tolerant and showed very little freeze damage during the winter of 1991-1992. Soil moisture levels were low during the spring, but did not hinder seed production. If an accession with a low plant height could be selected, acreage of rye planted as a cover crop could be comparable to that of wheat.

Project 28I113M - Selection of a Dwarf Cultivar of Wheat, *Triticum aestivum*

Objective of this project is to select a cultivar(s) that produces adequate canopy cover with a low plant height.

Eight-four accessions were evaluated during 1991-92 growing-season. Generally, low plant height was associated with poor plant vigor. Twelve accessions were rated 6 for plant vigor on April 6. (scale 0-9; 0=poor; 9=good). Maximum plant height at maturity was 64 cm. These accession are: PI-347167, PI-351598, PI-418578, PI-438966, PI-438967, PI-438969, PI-470673, PI-470708, PI-470710, PI-470711, PI-470754, PI-481567.

Significant finding(s)

Despite the 1991-92 growing-season for wheat was considered to be mild, these 12 accessions showed little or no damage to low temperatures that occurred. Soil

moisture levels were low during early spring, but did not affected seed production. Wheat can be planted later and is cheaper to plant than legumes. If an accession with low plant height can be selected, the problem of wheat interfering with planting can be greatly reduced.

Project 28I114M - Selection of an annual bluegrass (*Poa annua*) cultivar for winter cover.

Objective of this study is to select an accession(s) with best growth habit and adaptation for use as a cover crop.

Fifty-four accessions were collected from Afghanistan, Canada, and across the southeastern U.S.

Significant finding(s)

No outstanding characteristics were found among the accessions. Many had low germination rates and emerged to poor stands.

Project 28I116M - Selection of a cultivar of sour clover (*Melilotus indica*) for winter cover.

Main objective of this study is to conduct preliminary studies of establishment and growth requirements of sourclover prior to planting an assembly.

An assembly of 70 accessions were obtained from field collections, and from the ARS, PI station, Ames, IA. A germination study, pH study, and optimum moisture regime trials were conducted to resolve prior problems with sourclover.

Significant finding(s)

Germination continues to be a problem with sourclover. stratification, scarification, or some other technique may be used to overcome germination problems. Cold, wet, acid soils present problems when working with sourclover, and may limit their use. Overall, sourclover has not seemed well adapted to conditions at the PMC.

EVALUATION OF WINTER ANNUALS

Winter annuals that occur as "weeds" in cultivated fields can provide good winter cover and are an effective means for controlling erosion. Seeds of various winter annuals were collected and evaluated for their potential use in no-till cotton.

The following weedy species are being investigated: Chickweed (*Stellaria media*), Henbit (*Lamium amplexicaule*), Wild geranium (*Geranium* spp.) and Wood sorrel (*Oxalis stricta*)

Significant finding(s)

Of the limited accessions of each species evaluated, none showed any outstanding characteristics. Wild geranium was dropped from the study because of its potential to harbor cotton pests.

INITIAL SEED INCREASE

Project 28A115M - Selection of a Cultivar of Rescuegrass (*Bromus unioloides*) for winter cover

Four accessions of rescuegrass showed potential for use winter cover in no-till or conservation tillage system. These accessions are: PI-250648 Pakistan; PI-442079 Japan; 9054984 Stephens Co.,TX; and 9054989 Wilson Co.,TX. These accessions are currently being increased for advanced testing.

ADVANCED EVALUATIONS PROJECTS

Project 28A801M - Interseeding Common Row Crops In Selected Plant Materials

Project Supplements

Project Title - Peanut Response to Cover Crops and Tillage *

Soil loss from peanut (*Arachis hypogaea*) production has been estimated by the SCS to be as high as 22 tons/A. This excessive soil loss is attributed to soil disturbance at planting and harvesting, and low amounts of residue following harvest.

Objective of this study is to evaluate the effects of cover crops and no-tillage on peanut production.

Crimson clover (*Trifolium incarnatum* var. 'Tibbee'), hairy vetch (*Vicia villosa*), rye (*Secale cereale* var. 'Elbon'), and wheat (*Triticum aestivum*) were used as the cover crops, and no-till native and conventional tillage served as checks.

Significant finding(s) in 1992

This study supported earlier work that peanuts can be successfully grown in a no-till system. It also showed that cover crops benefited peanut plant growth by soil moisture conservation but did not influence yield. Use of a cover crop should not be based solely on its effect upon crop yield but upon its ability to improve the soil structure and fertility. Additional years data is required before final conclusions are made.

Project Title - Sweet Potato Response to Tillage and Cover Crops *

Sweet potato (*Ipomoea batatas*) is considered to be a highly erodible crop. Seedbed preparation and harvesting activities are major contributors to soil loss associated with this crop. Seedbed preparation, which consists of disking and hipping multiple times, and harvesting methods decreased the amount of crop residue remaining on the soil surface. Soil loss from sweet potato production has been estimated by the SCS to be in excess of 20 ton/A.

* For more detailed information on this project, request a copy of the technical notes.

Objective of this study is to evaluate the effects of cover crops and no-tillage on sweet potatoes.

Crimson clover (*Trifolium incarnatum* var. 'Tibbee'), hairy vetch (*Vicia villosa*), rye (*Secale cereale* var. 'Elbon'), and wheat (*Triticum aestivum*) were used as the cover crops, and no-till native and conventional tillage served as checks.

Significant finding(s) in 1992

Results showed that no-till sweet potato produced similar yields to conventional-till sweet potato. Cover crops did not influence yield but a tendency was noted for higher #1 and total yields to be higher in the rye and hairy vetch plots. Additional years data is needed before final conclusions are drawn.

Project Title - Arrowleaf clover as a N Source for No-till Grain Sorghum

Research has shown that crimson clover and hairy vetch can reduce the need for commercial N in no-till grain sorghum (*Sorghum bicolor*) production. Arrowleaf clover (*Trifolium vesiculosum*) has been evaluated in forage systems, but not for grain sorghum production.

Objective of this study is to determine if grain sorghum can be grown successfully no-till in arrowleaf clover, and the amount of N supplied to grain sorghum by arrowleaf clover. Also, to determine if arrowleaf clover, which has approximately 75% hard seed, will reseed itself for several years without being allowed to produce a seed crop each year prior to chemical burn down.

'Meechee' arrowleaf clover and 5 N rates (0, 30, 60, 90, and 120 lb/A) plus a fallow check will be used in the study.

Status

Plots were established in October, 1992. First years data will be collected in August, 1993.

Project Title - Arrowleaf clover as a N Source for No-till Cotton

Research has shown that crimson clover and hairy vetch can reduce the need for commercial N in no-till grain sorghum (*Sorghum bicolor*) production. Arrowleaf clover (*Trifolium vesiculosum*) has been evaluated in forage systems, but not for cotton (*Gossypium hirsutum*).

Objective of this study is to determine if cotton can be grown successfully no-till in arrowleaf clover, and the amount of N supplied to cotton by arrowleaf clover. Also, to determine if arrowleaf clover, which has approximately 75% hard seed, will reseed itself for several years without being allowed to produce a seed crop each year prior to chemical burn down.

'Meechee' arrowleaf clover, and 5 N rates (0, 30, 60, 90, and 120 lbs/A) plus a fallow check will be used in the study.

Status

Plots were established in October, 1992. First year's data will be collected in October, 1993.

Project Title - Legume Cover Crops for Cotton and Sorghum

Objective of this study is to identify legumes cover crops that will reseed in cotton and sorghum production system.

This study was initiated by the USDA-ARS, Oxford, MS, and involves private, state and federal agencies including the PMC, USDA-ARS, Auburn, AL, the Universities of Arkansas, Tennessee and Georgia, MAFES, Verona, MS, and Rodale Institute, Fayetteville, AR.

The following legumes and ryegrass (*Lolium multifolium* var. 'Gulf') are being evaluated for cover crop use in cotton and sorghum systems: crimson clover (*Trifolium incarnatum* var.'Tibbee'), subclover (*Trifolium subterraneum* vars. 'Nungarin', 'Northam', 'Daliak', 'Rosedale', 'Mt. Barker'), bur clover (*Medicago arabica* vars. 'Serena', 'Circle Valley', and hairy vetch (*Vicia villosa*).

Significant finding(s)

Not all participants obtained the same results. The following results were obtained from evaluations made at the PMC location only. Two legumes (bur clover 'Serena' and subclover 'Nungarin' produced blooms on February 20. Subclovers 'Daliak' and 'Northam' had bloomed by February 26. Crimson clover, hairy vetch, and ryegrass were much later in maturing by blooming on April 27. In general, species with an early bloom date produced a low dry matter yield. Crimson clover and ryegrass produced the highest yields while Nungarin and 'Dalkeith' (March 4) produced the lowest. Final conclusions cannot be drawn until additional years data is obtained.

Better Plants For Field Borders, Strips, and Steep Terraces

INITIAL SEED INCREASE

Project 28A105B - Selection of a variety of slender lespedeza (*Lespedeza virginica*)

Four accessions (9021710 Hinds Co.,MS; 9045268 Marion Co.,AR; 9045294 Crawford Co.,AR; and 9045296 Copiah Co.,MS) were selected from among 68 accessions for potential use in field borders and strips. These accessions are currently being increased for advanced evaluations.

ADVANCED EVALUATION PROJECTS

Project 28C804L - Establishment and Management of Vegetative Hedges

Sloping cropland frequently requires terraces or contour grass strips in addition to conservation tillage practices for adequate soil protection. Conventional terrace systems have aided in the reduction of soil erosion, but they are expensive to install

and maintain. Conventional contour grass strips require that approximately 30% of the cropland be put in sod and are not as effective as terraces.

Vegetative hedges are narrow (1-6' wide), tall growing, stiff vegetative strips planted on the contour or across the slope on spacings similar to parallel terraces. Their function is to slow water runoff and trap sediment. Vegetative hedges have the potential to become a cost-effective alternative for controlling erosion.

Objective of this study is to evaluate various perennial plant species or combination of species with potential for use as a vegetative hedge, and evaluate their effectiveness in trapping sediment in a row-cropped field.

Following are species being evaluated for potential use as a grass hedges:
Giant Reed (*Arundo donax*), Eastern gamagrass (*Tripsacum dactyloides*), Vetiver grass (*Vetiveria zizanioides*), Native Blackberry (*Rubus* spp), Pampasgrass (*Cortaderia selloana*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Chinese silvergrass (*Miscanthus sinensis*), Big bluestem (*Andropogon geradii*), 'Amquail' Lespedeza (*Lespedeza thumbergii*), 'Cowboy' Laurisagrass (*Pennisetum orientale*), Dwarf switchcane (*Arundinaria gigantea*), Indian Plumegrass (*Erianthus* spp), and 'KY 31' Tall fescue (*Festuca arundinacea*), which serves as a check.

Status - In spring of 1992, species mentioned above were established in 5'x 30' plots with an average slope of 6.8%. Seven additional species were planted in October, 1992. All plots were randomized and replicated three times on contours spaced 63' apart. Hedge spacing was determined by taking half of the terrace spacing formula and allowing five foot for the new hedge (straddle width of tractor), plus 3' of anticipated width for hedge aging, and one additional foot for planter drift. Creeping red fescue (*Festuca rubra*) was planted as a companion crop with most of the hedges to give protection for the back-slope. Once the hedges are established, the field will be summer fallowed to induce erosion. A small grain cover crop will be planted to provide crop residues which may play an important role in the hedge's effectiveness in trapping silt. Evaluation and management of the species will begin in 1993-94.

Vegetative hedges planted across the slope of a field at the PMC.

DISCONTINUED PROJECTS

These projects were discontinued in 1992.

Project 28I107B - Initial Evaluation of Herbaceous Mimosa (*Mimosa strigillosa*)

Project 28A123E - Selection of a Cultivar of Vetiver Grass (*Vetiveria zizanioides*) for Soil and Water Conservation

PASTURE AND RANGELAND EROSION CONTROL

Warm-Season Forage Grasses

INITIAL EVALUATION PROJECTS

Project 28I118M - Selection of a Superior Eastern Gamagrass (*Tripsacum dactyloides*) for the Southeast

Objective of this study is to select an accession(s) of eastern gamagrass for warm-season forage production.

Seventy-three accessions were assembled from across the PMC service area between 1990-91. Seeds of each accession were germinated in the greenhouse and transplanted to the field. Survival rate from transplanted material was excellent.

Status - First evaluations were made in 1992 from an assembly with a broad range of genetic variation for making selections. Some of the large, robust accessions could potentially be useful as a perennial silage crop. Because of its high palatability and vigorous growth habit, eastern gamagrass could become a valuable component in southern forage systems. Several accessions are exhibiting desirable forage attributes including 9058958 Pachuta, MS; 9058454 Booneville PMC; 9062678 Clarksville, TN and 9062680 Clarksville, TN.

Eastern gamagrass has been regarded as the highest forage producing native grass.

WOODLAND EROSION CONTROL

Desirable Plants For Clear-cut Sites

INITIAL SEED INCREASE

Project 28A101D - Increase of superior accessions of partridge pea (*Cassia fasciculata*)

Three accessions, 9021655 Crawford Co.,AR; 9021660 Columbia Co.,AR; and 9028375, Lee Co.,AR were selected from an assembly of 116 accessions of partridge pea evaluated from 1981-85 on the basis of ground cover, vigor, seed production, and hardiness. Accessions are currently being increased for advanced evaluations and large-scale increase.

ADVANCED EVALUATION PROJECTS

Project 28A106B - Selection of a trailing wildbean (*Strophostyles helvula*) accession

Thrity-two accessions of trailing wildbeans were evaluated from 1985-88 for wildlife food. Ten accessions were selected on the basis of vigor for advanced evaluations. Five accessions were selected from the ten accession on the basis of seed yield, size, color, and texture. Accessions were: 9017146 via national PMC; 9021718 Washington Co.,MS; 9008290 Colorado Co.,TX, and 9021719 Crittenden Co.,AR. Also included is three lots of accession 9062715 Yalobusha Co.,MS, which showed some shatter resistance.

Objective of this study is to identify and isolate accessions with superior seed production and shatter resistant qualities.

Status

Twenty-five plants of each accession and/or lot were established in space planted plots. Evaluations were made as scheduled with much attention given to date of maturity, shatter resistance, and color and texture of seed. Seeds of these accessions having desirable characteristics will be advanced for pure-line selections.

Because of its trailing and twinning habitat, trailing wildbean is grown next to stakes for support during the evaluation process.

CRITICAL AREA EROSION CONTROL

Vegetation For Drastically Disturbed Sites

INITIAL EVALUATION PROJECTS

Project 28I110M - Initial evaluation of Heat Tolerant Crownvetch (*Coronilla varia*) Accessions

Accessions 9028585 (Yalobusha Co.,MS) along with commercial varieties 'Emerald', 'Chemung' and 'Penngift' have been evaluated previously for heat tolerance at this PMC. Renewed interest in crownvetch has prompted the need to re-evaluate the heat tolerance of these materials. Additional evaluations were made and plants of 9028585, displaying superior heat and drought tolerance, were selected for initial seed increase.

28A103B - Seed Increase of Purpletop (*Tridens flavus*) Accessions

Accessions 9002937 (KYPMC), 9041780 (KYPMC) and 9028270 (Yell Co.,AR) were selected from among 114 accessions of purpletop for factors relating to stand, vigor, foliage production, seed production, and resistance to environmental pressure. These accessions are currently being increased for advanced evaluations and large-scale increase.

28A104D - Seed Increase of Beaked Panicum (*Panicum anceps*) Accessions

Three accessions, 9002928 (Kentucky PMC - KYPMC), 9028349 (Jefferson Co.,AR), and 9028510 (Wayne Co.,MS) of beaked panicum were selected from an assembly containing 91 accessions. They were selected based on factors related to stand, vigor, foliage production, seed production, and resistance to environmental pressure. Accessions are currently being increased for advanced evaluations and large-scale increase.

Vegetation For Shorelines of Ponds, Lakes, and Streams

ADVANCED EVALUATION PROJECTS

Project 28A482E - Stream Channel Stabilization Using Wattling Technique and Riparian Vegetation

Wattling is a technique that has been used for many years as a means for controlling erosion. It consists of tying bundles of flexible twigs together, laying bundles in a trench on the contour of cut or fill slopes, stream channels, or shorelines, staking the bundles to the slope, and partially back-filling with soil. Installed rows of wattling trap sediment, slow water movement, provide an environment for establishment of grasses and legumes, and may sprout themselves to provide vegetative cover (depending on species used).

Objective of this study is to determine suitable plant materials for wattling purposes to control erosion.

Following are species that were planted by the PMC in 1992 within three hydrological zones (1' above shoreline, waterline and immersed below waterline), and evaluated for their adaptativeness at each zone: gilg willow (*Salix gilgiana*), erect willow (*Salix liqulifolia*), 'Bankers' willow (*Salix cotteti*), giant reed (*Arundo donax*) and river birch (*Betula* spp.). Plants were evaluated periodically for zonal tolerance and how well they rooted and sprouted.

Significant finding (s)

Several of the willows species performed well in all zones. These willows were: gilg, erect, and 'Bankers'. These same willows also exhibited excellent rooting and sprouting abilities. This study is planned to be expanded in 1993 to include other woody and herbaceous species.

Animal Waste Treatment
Non-point Pollution and Contamination of Groundwater
Removal of Toxic Chemicals

Although there are currently no formal studies underway to address water quality issues directly, the following project does have water quality implications.

Waterways Experiment Station Project

An interagency agreement with the U.S. Army Corps of Engineers, Waterways Experiment Station (WES) at Vicksburg, MS, was initiated in May 1991. This agreement provided for the PMC to: (1) develop a directory of vendors with wetland plants; (2) prepare a manual on identification, propagation, establishment, and management of species used for wetland mitigation; and (3) provide for testing plants in drawdown areas of Corps of Engineer reservoirs. Following is an update on the progress of the project.

Wetland Plant Vendors

A manual containing a national directory of vendors of wetland plants was completed in November, 1992. This manual is designed to provide the user with vendors growing specific wetland plants. This is a useful tool for those interested in purchasing wetland plants for use in constructed wetlands, or wetland restoration and mitigation programs. The manual is available on Interlibrary Loan Service from the WES Library, telephone (601) 634-2355. To purchase a copy, call the National Technical Information Service at (703) 487-4650.

Wetland Plant Manual

A second manual is currently being compiled by PMC staff, and will consist of information on wetland plants relative to natural distribution, description, use, commercial availability, propagation, and management. This manual will be a valuable tool for those interested in propagation and management of wetlands plants used in constructed wetland, restoring and/or enhancing an existing wetland.

Reservoir Drawdown Study

This project compares commercially available wetland species for inundation and drought tolerance on selected reservoir sites. Four reservoir were selected as test sites. These reservoir are: Tuttle Creek Reservoir, KS, Grenada Reservoir, MS, Sayer Reservoir, PA, and Green Peter Reservoir, OR. The PMCs in those states where the reservoirs are located were responsible for planting and managing the plantings, except for the Sayer Reservoir, which is managed by the Big Flats, NY, PMC. Three test locations planted four accessions each of *Scripus validus*, *Juncus effusus*, *Scripus cyperinus*, and *Scripus americanus*. Each of these species was represented by an accession from a commercial vendor in Florida, Maryland, Wisconsin plus a "local" collection from the vicinity of the test site. Each participating PMC also collected and planted other "local" species appropriate for for this test. Kansas PMC was unable to plant due to high water.

All test sites were planted in 1992 with the Grenada Reservoir plantings made in November, 1992. Soft rush (*Juncus effusus*), Olney's bullrush (*Scripus americanus*), Woolgrass (*Scripus cyperinus*), Soft stem bullrush (*Scripus validus*), Green bullrush, (*Scripus atrovirens*), Hop sedge (*Carex lupulina*) are being evaluated at three elevations on Grenada Reservoir.

Significant finding(s)

Plantings were not subjected to flooding in 1992 at the Grenada Reservoir. Differences in morphology and phenology were observed between species from each geographical source. Drought tolerance between species, and possibly between sources within some species was also observed. Results from the other reservoir plantings are not known at this time.

INTERCENTER STRAIN TRIALS

As plant materials are carried through the evaluation process, there is a need to know how those plants will perform at other locations. Because SCS Plant materials are located strategically throughout the United States, they are convenient locales to test and determine the range of adaptation of selected materials. Requests are occasionally made by other PMC's to the Jamie L. Whitten Plant Materials Center to carry out these studies.

Species currently in an intercenter strain trials at Coffeeville are:

Smooth alder (*Alnus serralata*) from Quicksand, KY, PMC
Sitka alder (*Alnus sinuata*) from Corvallis, OR, PMC
Sitka willow (*Salix chensis*) from Corvallis, OR, PMC
Hooker willow (*Salix hookeriana*) from Corvallis, OR, PMC
Pacific willow (*Salix lasiandra*) from Corvallis, OR, PMC
Erect willow (*Salix ligilifolia*) from Corvallis, OR, PMC
Herbaceous mimosa (*Mimosa strigillosa*) from East Texas, PMC
Crimson clover (*Trifolium incarnatum*) from Americus, GA, PMC
Hairy vetch (*Vicia villosa*) from Americus, GA, PMC

Smooth alders received from Quicksand, KY in 1991 appears well adapted. All plants have survived and there have been no insect or disease problems, and no injury from drought, heat or cold. Plants are growing well, with male flowering parts first developing in late 1992.

Five accessions of dwarf willow were received from Corvallis, OR. in 1989. In 1991, sitka alder was also received from Corvallis. Sitka alder failed to survive its establishment year. Dwarf willow accessions have managed to persist, but they seem poorly adapted. Insect and disease problems have been encountered and survival is low.

Mimosa was established in 1992. Survival was good, despite its slow rate of establishment. Crimson clover and hairy vetch plantings were initiated in the fall of 1992. Subsequent survival, growth and development will be evaluated in spring of 1993.

NATIONAL PARK SERVICE PROJECT

In recent years, USDA SCS Plant Materials Centers have been cooperating with the National Park Service (NPS) producing seed and plants of selected vegetation for NPS use. The NPS requires that plant materials used for revegetating purposes originate within a specified section of the park boundaries. It is the PMC's task to harvest those materials from the target area and increase both seed and plants for the revegetation or reclamation activity.

In 1990, the Jamie L. Whitten Plant Materials Center entered into a cooperative, agreement with the Natchez Trace Parkway, (National Park Service), to produce plant materials for revegetation work on the last segment of the Parkway, now under construction. The Center, in 1992, also agreed to test and evaluate procedures to best establish these materials on newly constructed road right-of-ways and similarly disturbed sites.

Ten species of grasses and forbs were initially put into increase in 1991 and an additional 9 species were collected and put into increase in 1992. Six woody species are also being increased. In 1992, 2220 woody plants were container grown at the center, and 740 pounds of bulk grass and forb seed were harvested and cleaned.

The following woody and herbaceous species are being increased at the PMC:

Woodies

Elliotts blueberry (*Vaccinum elliottii*), Carolina rose (*Rosa carolina*), Oak-leaf hydrangea (*Hydrangea quercifolia*), Witchazel (*Hamamelis virginiana*), American beautyberry (*Callicarpa americana*), Rusty blackhaw (*Viburnum rufidulum*).

Grasses

Little barley (*Hordeum pusillum)*, Virginia Wildrye (*Elymus virginicus*), Winter bentgrass (*Agrostis hyemalis*), Purpletop (*Tridens flavus*), Little bluestem (*Schizachyrium scoparium*)

Forbs

Tickseed coreopsis (*Coreopsis lanceolata*), Partridgepea (*Cassia fasciculata*), Rosin weed (*Silphium integrifolium*), Sunflower (*Helianthus angustifolius*), Mistflower (Eupatorium coelestinum), *Bidens aristosa* (Bur marigold), Heartleaf aster (*Aster cordifolius*), Calliopsis (*Coreopsis tinctoria*), Blue-eyed grass (*Sisyrinchium angustifolium*), Black-eyed susan (*Rudbeckia hirta*), Clasping coneflower (*Dracopsis amplexicaulis*), Philadelphia fleabane (*Erigeron philadelphicus*), Lyre-leaf sage (*Salvia lyrata*)

Plant Materials Available For Commercial Production

Listed below are the plant materials released from the Jamie L. Whitten PMC for commercial production.

'Quail Haven' Reseeding Soybean, *Glycine soja* Siebold & Zucc.

'Quail Haven' was released for wildlife use in 1986. It is a vining annual legume that produces an abundance of small seeds that are eaten by quail and dove. It produces many hard seeds that remain on the soil throughout the winter and germinate the following spring. 'Quail Haven' may also be used for hay and as summer cover for soil improvement.

'Meechee' Arrowleaf Clover, *Trifolium vesiculosum* Savi

'Meechee' was released for commercial production in 1966. It is an annual legume that is a high producer of quality forage in spring and earlier summer. 'Meechee' may also be used as a cool-season cover crop. A common practice in North Mississippi is to seed 'Meechee' with ryegrass to extend grazing.

'Chiwapa' Japanese Millet, *Echinochloa frumentacea* (Roxb.) Link

'Chiwapa' was released for wetland wildlife in 1965. It can be sown on mud flats in the summer and flooded after maturity to provide food for waterfowl. 'Chiwapa' also produces an abundance of foliage that can be utilized by livestock.

'Wilmington' Bahiagrass, *Paspalum notatum* Fluegge

'Wilmington was released for pasture and hay production in 1971. It proved to be more cold hardy than 'Pensacola', but low seed yield and quality restricted its use.

'Halifax' Maidencane, *Panicum hemitomon* J.A. Schultes

'Halifax' was released for stream and lake bank stabilization in 1974. 'Halifax' does not produce seeds; therefore, propagation is done vegetatively from rhizomes.

Seeds of all the above releases except 'Halifax' maidencane are available for certified seed production from:

Foundation Seed Stock
Mississippi State University
P.O. Box 5267
Mississippi State, MS 39762

Those interested in producing 'Hailfax' maidencane or other SCS releases may also contact the Jamie L. Whitten PMC.

Technical Reports Available For Distribution

Technology transfer is a major priority at the PMC. Since 1985, numerous reports have been prepared on plant materials projects conducted on and off the PMC. Technical reports available for distribution are listed below.

1992 Reports

Selection of a Cold Hardy Bahiagrass Cultivar L.H. Bloodworth, J.A. Wolfe, and J.A. Snider
Low Maintenance Trials of Warm-Season Species on Surface Mines J.A. Wolfe
Seed Production and Variation Among Selected Trailing Wildbean Accessions J.A. Wolfe
Field Plantings of Afghan Reedgrass J.A. Wolfe
Field Plantings of Four Willow Selections J.A. Wolfe
Bluegrass Variety Trials J.A. Snider and J.A. Wolfe

1991 Reports

Response of Selected Accessions to Common Herbicides L.H. Bloodworth
Seed Production and Variation Among Selected Partridgepea Accessions J.A. Wolfe

1990 Reports

Initial Evaluation of Beaked Panicum J.A. Wolfe and J.A. Snider
Initial Evaluation of Purpletop J.A. Wolfe and J.A. Snider
No-Till Cotton Trails: I. Establishment Methods of Cover Crops in No-Till Cotton L.H. Bloodworth
No-Till Cotton Trials: II. Effects of Cotton Herbicides on Cover Crops L.H. Bloodworth
No-Till Cotton Trials: III. Effects of Cover Crops on Tillage and Cotton L.H. Bloodworth
Advanced Evaluation of Giant Reed: Comparison of a Coffeeville PMC Selection with Five Accessions from Brooksville J.A. Wolfe and B.B. Billingsley
Initial Evaluation of Rescuegrass for Winter Cover J.A. Wolfe and J.A. Snider

1989 Reports

Initial Evaluation of Trailing Wildbean J.A. Wolfe, J.A. Snider, and B.B. Billingsley

1988 Reports

Arkansas Blackland Prairie Field Evaluation Planting IX: Plant Performance in Adaptation Studies J.A. Wolfe
Investigations into the Establishment of Vegetative Flumes at the Coffeeville PMC B.B. Billingsley, J.A. Snider, and J.A. Wolfe
Evaluation of Potential Cover Crop Species for use in Chemically Treated Cotton Fields J.A. Snider, J.A. Wolfe and B.B. Billingsley

No-Till Trials for Common Row Crops I. Milo Production Following Six Cover Crop Treatments J.A. Wolfe, J.A. Snider, and B.B. Billingsley
No-Till Trials for Common Row Crops II. Establishment of Cotton and Soybean into Winter Cover Without Plowing B.B. Billingsley, J.A. Snider, J.A. Wolfe

1987 Reports

Initial Evaluation of Partridgepeas J.A. Wolfe and J.A. Snider
Initial Evaluation of Illinois Bundleflower J.A. Wolfe and J.A. Snider
Advanced Evaluations of Giant Reed: I. Results of Monthly Planting Study J.A. Wolfe, J.A. Snider, and B.B. Billingsley.
Advanced Evaluation of Giant Reed: II. Planting Position Study B.B. Billingsley, J.A. Snider and, B.B. Billingsley
Advanced Evaluation of Giant Reed: III. Survival and Spread Study J.A. Snider and J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting III: Performance of Introduced Bluestems J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting IV: Performance of native Bluestems J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting V: Performance of Switchgrasses J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting VI: Performance of Indiangrasses J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting VII: Performance of Shortgrasses J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting VIII: Performance of Five Lespedeza Varieties J.A. Wolfe

1986 Reports

Arkansas Blackland Prairie Field Evaluation Planting I: Plant Performance in Management Trials J.A. Wolfe
Arkansas Blackland Prairie Field Evaluation Planting II: Changes in Plant Performance over Three Years J.A. Wolfe
Rooting Trials for Promising Willows J.A. Wolfe, J.A. Snider, and B.B. Billingsley
Advanced Evaluation of Afghan Reedgrass: I. Results of Planting Trials J.A. Snider and J.A. Wolfe and J.A. Snider
Advanced Evaluation of Afghan Reedgrass: II. Effects of Clipping on Production J.A. Wolfe, B.B. Billingsley, and J.A. Wolfe

1985 Reports

Initial Evaluation of Yellow Bluestem J.A. Wolfe, B.B. Billingsley, and J.A. Snider
Initial Evaluation of Limpograss J.A. Wolfe, B.B. Billingsley, and J.A. Snider
Initial Evaluation of Brunswickgrass J.A. Wolfe, B.B. Billingsley, and J.A. Snider
Initial Evaluation of Indiangrass J.A. Wolfe, B.B. Billingsley, And J.A. Snider

Copies of these reports may be requested from:

Jamie L Whitten PMC
Route 3 Box 215A
Coffeeville, MS 38922

Jamie L. Whitten PMC is located in north-central Mississippi within the Holly Springs National Forest about 6 miles west of the town of Coffeeville. To visit the Center, one may take the Tillatoba exit off Interstate 55 and travel 4.5 miles east on Mississippi Highway 330.